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Jaras

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[54] **APPARATUS FOR INSTALLING HAMMERS IN MUSICAL INSTRUMENT**

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[51] **Int. Cl.** **G10g 1/00**

[58] **Field of Search** 84/453, 458, 459, 254

[56] **References Cited**

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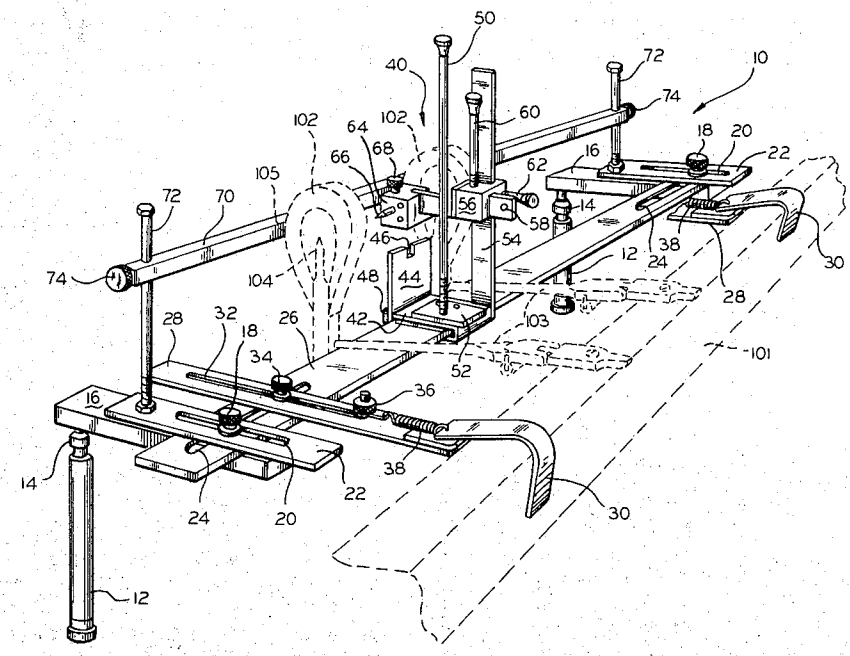
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[57] **ABSTRACT**

An apparatus for installing string-striking hammers in a musical instrument, such as piano, has a lower bar for aligning hammer tail sections of hammers being installed. The lower bar is releasably connected to a portion of the musical instrument being repaired. An upper bar is movable with respect to the lower bar and provides guide means for aligning hammers in proper angular position to insure proper striking of the strings. The lower bar carries guide elements having means for guiding the hammer being installed into proper angular position to insure that the hammer, when moved in the course of playing the instrument, travels in a correct path to reach the string and strikes it in a predetermined fashion at a precise point necessary to produce the desired sound.

8 Claims, 2 Drawing Figures



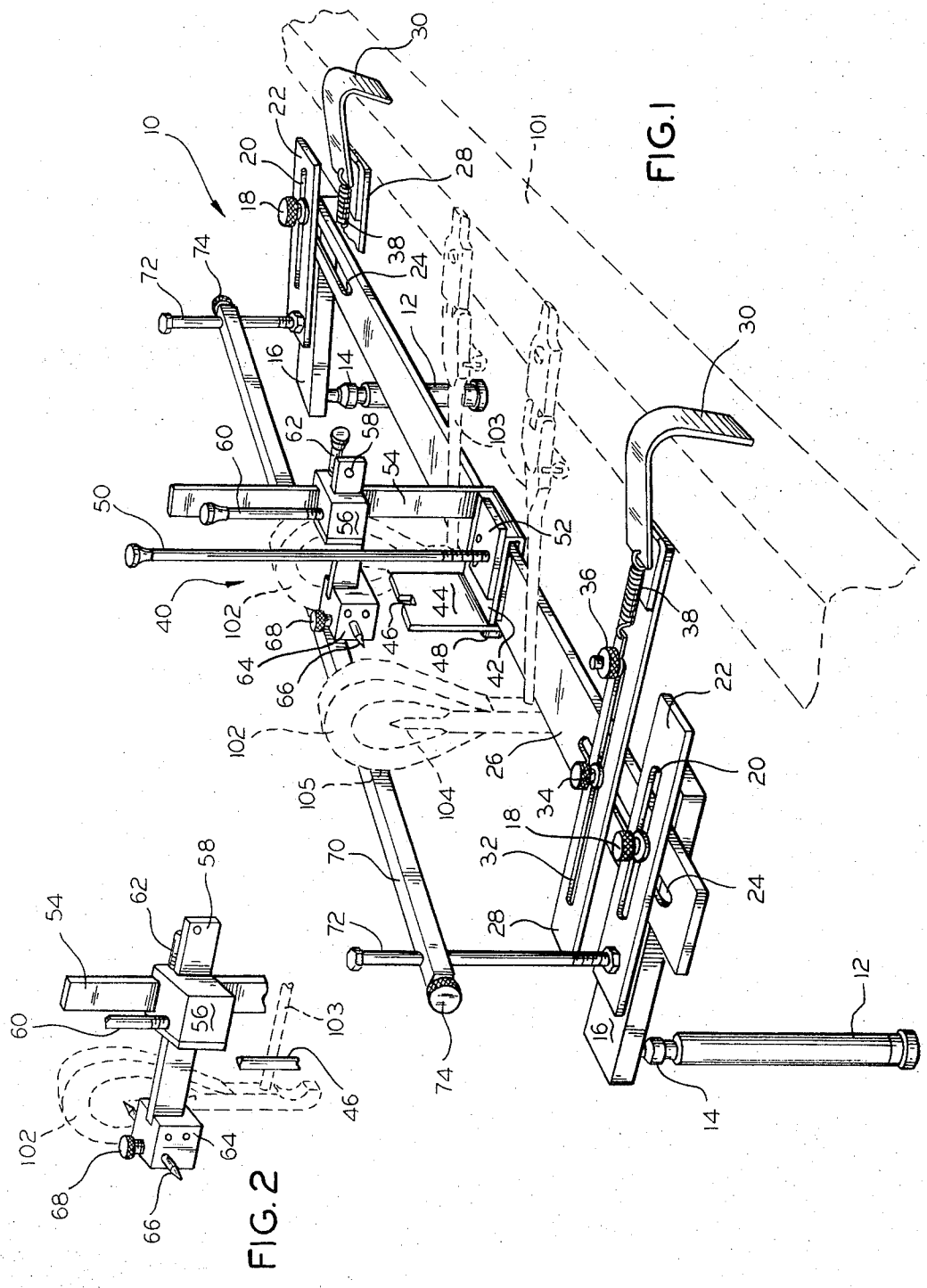

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FIG. 1

FIG. 2

APPARATUS FOR INSTALLING HAMMERS IN MUSICAL INSTRUMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an apparatus for installing hammers in a musical instrument and, more particularly, to an apparatus for installing and aligning string-striking hammers which are actuated by operation of piano keys, or the like.

2. The Prior Art

In a musical instrument, such as a piano or the like, the fingers of a player depress the keys which are connected to hammers inside the instrument. When keys are depressed, the hammers are moved to strike the appropriate strings thereby producing the desired sound. It is critical relative to the production of desired sound that the hammer hit the string at a precise point and that the striking contact with the string be made by a specific point on the circumference of the hammer. To achieve the above conditions, the hammers must be aligned very precisely with respect to the strings they are to hit.

When hammers become worn out, their replacement becomes necessary. Heretofore, installation and alignment of replacement hammers has been very time consuming due to large number of measurements which had to be taken relative to each hammer before satisfactory alignment could be achieved. The present invention overcomes the disadvantages heretofore experienced in the art and allows piano technicians, including sightless, to install piano hammers with an unprecedented precision in a fraction of the time required prior to the invention hereof.

SUMMARY OF THE INVENTION

The present invention overcomes the disadvantages of the prior art by providing an apparatus for fast and precise installation of string-striking hammers in a piano, or the like. The apparatus has an adjustable lower bar for aligning tail sections of hammers being installed and for carrying guide elements having means for establishing proper angular position of a hammer for striking the desired string. An upper bar, movable with respect to the lower bar, supplements one of the guide functions of the guide element.

DRAWING

FIG. 1 is a perspective view of the apparatus of the present invention with portions of the musical instrument shown in phantom; and

FIG. 2 is a detailed view of the striking-point guide of this invention.

Referring to the drawing, more particularly to FIG. 1, there is shown an apparatus, generally designated 10, for installing and aligning string-striking hammers in a musical instrument, such as a grand piano or the like, as hereinafter more fully described.

The apparatus has general supporting elements located at both ends thereof, the elements located at one end being substantially identical to their respective counterparts at the other end of the structure. Accordingly, where there are two or more substantially identical elements performing similar functions, a detailed description of only one of such elements will be given herein with the understanding that there may be more than one such element included in the apparatus.

The apparatus comprises a pair of vertical support members or legs 12, each of which occupies a similar position at a respective end of the structure. The leg 12 has a lock 14 which locks the height of the leg in place after desired height has been set by the user of the apparatus. Each of the legs 12 supports a horizontal bracket 16 located above the leg and movable in a vertical direction. The bracket 16 has a lock screw 18 mounted thereon which extends through a slot 20 in a horizontal holder 22 and a slot 24 in a first, or lower, bar 26 the end of which is sandwiched between the horizontal bracket 16 and the horizontal holder 22. The bar 26 may also be referred to as a hammer tail-alignment bar.

As can be readily seen in the drawing, the lock screw 18 controls longitudinal movement of the bar 26. The bar 26 is releasably connected to a pair of identical attachment bars 28 which, in turn are secured by hooks 30 to a shank rail 101 (shown in phantom) of a piano, or the like. The attachment bar 28 has an elongated slot 32 which receives a pair of knobs 34 and 36. The knob 34 locks the lower bar 26 to the attachment bar 28 while the knob 36 in an adjustment knob for the hook 30. A spring 38 is interposed netween the hook 30 and the bar 28, as shown, for the ease of attachment of the hooks to the shank rail.

A dual-function guide element 40, having a base 42, is slidably mounted on the lower bar 26 for movement therealong, as explained in greater detail later. The base 42 has a vertical plate 44 secured to one edge thereof in parallel relationship to the bar 26, said plate being a guide for establishing the correct path of travel for a hammer 102 in the musical instrument when the hammer is moved toward a string (not shown) for striking the same at a predetermined point so as to produce the desired sound. A slot 46, the function of which is explained later, is formed in the top of the plate 44.

A lock screw 48 secures the plate, or path-of-travel guide, 44 in a desired location. In addition to the lock screw 48, the path-of-travel guide has a vertical lock 50 which extends to the base 42 through a plate 52 positioned on top of the base.

In addition to the path-of-travel guide, the guide element 40 includes other guide means pertaining to the establishment of a correct striking point on the circumference of the hammer 102, said striking point contacting the string of the musical instrument to produce the desired sound.

A vertical member 54 is secured to a side of the base 42, as illustrated. Slidably mounted on said member 54 there is a main striking-point guide housing 56 having horizontal arm 58 adjustably slidable therethrough. A vertically oriented locking screw 60 extends into the main housing 56 to engage the arm 58 and to lock it in a desired position. A locking screw 62 secures the main housing 56 to the member 54 when desired height has been achieved.

Mounted on one end of the arm 58, there is a pin housing 64 which carries a movable pin 66 adapted to contactingly engage the hammer 102 in determining the striking point on the circumference thereof for striking the piano string therewith. The pin 66 may be secured in position by screw 68 or the like.

A second, or upper, bar 70 providing a guide for alignment of hammer striking points, as later more fully

explained, is movably mounted on a pair of posts **72** each of which is positioned on movable horizontal holder **22** heretofore described. A vertical adjustment of the bar **70** is accomplished by sliding the bar on posts **72** and locking it thereto by operating the knobs **74.**

In the exemplary operation, the apparatus, when placed in a piano where hammers are to be replaced, will span at least one section of the existing hammers. On most pianos the apparatus will span two first treble sections at once.

The replacement hammers are prepared for installation in a manner known in the art.

The hammers to be replaced are removed leaving two old hammers in the section being worked on as sample hammers. The second hammer from the beginning of the section and the hammer which is next to the last hammer in the section are retained as sample hammers. All shanks **103,** including the shanks carrying the sample hammers are lifted up into a vertical standing position.

The attachment bars **28** are placed against the shank rail **101** hooking the spring-loaded hooks **30** at each end of the section in which hammers are to be replaced. When the apparatus spans the first two treble sections, as mentioned above, it is necessary to retain only two old hammers as sample hammers, that is, the second hammer of the first section and the next-to-last hammer of the second treble section.

The legs **12** of the apparatus are adjusted to equal height and a slight downward slope is formed by the attachment bars **28** from the shank rail **101** toward the lower bar **26.**

Following the above, the user installs the hammers, one at each end of a section being worked on, said installation being temporary in nature so that these hammers are free from adhesive attachment to their respective shanks with each shank being placed flushly through a shank receiving aperture in the hammer. The lower, or tail alignment bar **26,** is moved to contact the two temporarily installed hammers, and the bar **26** is locked in position by operation of the knobs **34.** The locked position is maintained until all remaining hammers have been installed in the section. When the bar **26** is in the locked position, the sample hammers retained in the section are moved down on the bar **26** from their vertical standing position while the temporarily installed hammers are removed from their shanks and the shanks are lifted up into standing position.

The plate **44** of the path-of-travel guide is moved to a position near the first sample hammer and locked there by operation of the vertical lock **50.** In order to accomplish fine adjustment of the pin **66,** the screw **68** is released and the pin is slidably moved to a position near the sample hammer. This fine adjustment of the pin does not alter the hammer striking-point position.

To be certain that the path-of-travel guide is in correct vertical position, while working in the treble section, one must release the screws **48, 60,** and **62** and place the arm **58** into the slot **46** for positioning. Afterward, the screw **48** is tightened again. When the work is being performed with tenor or bass hammers which are found to be leaning and thus are angularly displaced from their proper attitude, the plate **44** of the path-of-travel guide must be adjusted so that its angle corresponds to the angle of the sample hammer in that particular section. Once the plate **44** attains said angle the correct angle can be formed with each of the hammers by placing the hammers against the plate **44.**

The pin **66** is positioned exactly at the molding point **104** of the sample hammer and screws **60** and **62** are tightened. These screws may be released only after the first new hammer has been installed in the section.

To install the first new hammer permanently, the path-of-travel guide is moved near the first hammer which previously has been placed on the shank. The vertical lock **50** is tightened. Adhesive is placed in the shank receiving aperture of the hammer. While adhesive is still wet, the hammer is pushed onto the shank until the hammer touches the bar **26.** The hammer is positioned so that its molding point or vertical center is in line with the pin **66** which has been preset to the angular position of the sample hammer described heretofore. The hammer is pressed by installer's fingers to the edge of the plate **44** to thereby set the correct path-of-travel position of the hammer.

Having installed the replacement hammer at one end of the section, the above procedure can be repeated for installation of a second replacement hammer at the other end of the section.

When both hammers have been installed, the striking-point guide housing **56** can be removed from the apparatus together with the arm **58,** the pin housing **64** and the pin **66** since the upper bar **70,** also known as the hammer striking-point guide bar, may be substituted in function for the striking-point guide. In operation, the screw **18** and the knob **74** are released and the bar **70** is adjustably moved until it touches the widest point on the circumference of the first hammer, as illustrated at **105** in FIG. **1.** Subsequently, the bar is adjusted to contact the widest point on the circumference of the second hammer installed near the opposite end of the piano section while maintaining contact with the first hammer. Once these contacts have been achieved, the screw **18** and the knob **74** are tightened to maintain the bar in position. The installation of additional hammers may proceed from the left side of the piano section after one additional hammer has been installed at the right side of the section next to said second hammer. The installation of hammers utilizes bar **70** in place of pin **66** and its related guide equipment. Adhesive is applied to the shank receiving aperture in the hammer. While the adhesive is still wet, the hammer is pushed onto the shank by hand until lower portion of the molding of the hammer touches the lower bar **26** while the widest point on the circumference of the hammer touches against the upper bar **70.**

When all hammers in the section have been installed, the apparatus is moved to another section requiring installation of new hammers where the above outlined exemplary operation may be repeated.

I claim:

1. An apparatus for installing string-striking hammers in a musical instrument, such as piano or the like, comprising:

a. an adjustable support member;

b. a first movable bar connected to said support member and having means for releasable attachment to a portion of the musical instrument;

c. a second movable bar connected to said first bar by connecting means;

d. said first and second bars being movable with respect to one another;

e. a guide element slidably mounted on said first bar and having:

i. a plate for contacting the hammer being installed to provide a guide for placing said hammer in position to strike a predetermined point on the string of the musical instrument;

ii. a pin for contacting said hammer and providing a guide for locating said hammer in position to strike said string with a predetermined portion of said hammer.

2. An apparatus as defined in claim **1,** wherein said first bar is a lower bar.

3. An apparatus as defined in claim **1,** wherein said second bar is an upper bar.

4. An apparatus for installing string-striking hammers in a musical instrument, such as piano or the like, comprising:

a. a support member;

b. a movable bar connected to said support member and being movable in vertical and horizontal directions;

c. guide means slidably mounted on said bar for contacting the hammer being installed in the instrument and providing a guide for locating said hammer in position to strike a predetermined point on the string of said instrument with a predetermined portion of said hammer.

5. An apparatus as defined in claim **4,** wherein said means includes a vertical plate.

6. An apparatus as defined in claim **4,** wherein said means includes a movable pin.

7. An apparatus as defined in claim **6,** wherein said pin is slidably carried in a pin housing connected to a slidable arm adjustably received in a guide housing slidably secured to a vertical member.

8. An apparatus for installing string-striking hammers in a musical instrument, such as piano or the like, comprising:

a. a pair of adjustable legs;

b. a movable bar having means for attachment to the instrument;

c. a guide element carried by said bar and slidable thereon including:

i. a path-of-travel guide comprising an adjustable vertical plate secured to a side of said element;

ii. a striking-point guide comprising a vertical member having a guide housing mounted thereon, said housing supporting a movable arm connected to a pin housing at one end, said pin housing holding a pin adjustably slidable therein.

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